

REMARKS/ARGUMENTS

Claim Status

Claims 1-31 are pending. Claims 1-15 and 18-31 stand rejected. Claims 16 and 17 stand objected to as allowable if re written in independent form. Applicant appreciates the examiner's indication of allowable subject matter. Applicant maintains the patentability of claims 1-15 and 18-31 and respectfully requests reconsideration and withdrawal of the rejections and objections to claims 1-31.

Claim Rejections - 35 U.S.C. § 102 and 103

Claim 1 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U. S. Patent No. 5,313,614 to Goettelmann et al., hereinafter "Goettelmann." The applicant respectfully traverses this rejection.

The applicant's invention takes a novel approach to emulation that overcomes the shortcomings of conventional emulation. According to the invention, the target program to be emulated is first statically translated to a series of instructions of an intermediate instruction set. *The intermediate instruction set is an instruction set that is optimized for interpretation on the host computer.* It is not the native instruction set of either the program's host or the target host computer. *The series of instructions of the intermediate instruction set is then executed by interpretation on the host computer.* Because, the intermediate instruction set is an instruction set that is optimized for interpretation on the host computer, the execution of the series of instructions by interpretation is generally faster than conventional interpretation. Further, the intermediate instructions may be executed (by interpretation) without translation into assembly code or machine code particular to the host computer.

Claims 1, 9, 19, and 27 includes features that are not disclosed or suggested by the cited reference, namely as represented by claim 1:

1. A method for emulating the execution of a target program comprising instructions of an instruction set of a target on a host computer having a different instruction set, said method comprising:

performing a static translation of the instructions of the target program into a series of instructions of an intermediate instruction set, the intermediate instruction set being optimized for interpretation on the host computer; and
executing the series of instructions of the intermediate instruction set by interpretation on the host computer. (emphasis added)

Goettelmann does not disclose or suggest the features of claims 1, 9, 19, or 27. Generally, Goettelmann discloses conventional translation of code from a first code (for a first machine) to a second code (for a second machine) (in a similar manner as the Dunn, Chan, and Souloglou references that have been cited by the examiner in several of the previous five office actions). More particularly, Goettelmann discloses that first code can be converted into an intermediate language representation (c. 15, ll. 61-65). The intermediate language representation may then have redundancies and unnecessary code eliminated (c. 15, ll. 65-68) – *i.e.*, a conventional optimization step. Finally, the intermediate language representation is *further translated* to machine specific assembly or object code of the second machine (c. 15, l. 68 - c. 16, l. 2).

Goettelmann, however, does not disclose or suggest *executing the series of instructions of the intermediate instruction set by interpretation* on the host computer, as recited by the claims. Because the intermediate instructions are interpreted directly by the host (*i.e.*, second) computer, there is no need to further translate the intermediate instructions into assembly code or machine code on the second computer. In contrast, Goettelmann expressly teaches *further translating* the intermediate instructions into assembly code of the host machine and *then* using either an interpreter to execute the translated, machine specific assembly code (not the intermediate instructions) or to compile that code to machine specific object code on the host. Goettelman does not teach or suggest interpreting the intermediate instructions directly by the second computer, as recited in the present claims.

Not surprisingly, Goettelmann also does not disclose an intermediate instruction set *being optimized for interpretation on the host computer*. Rather, Goettelmann merely discloses processing (conventional optimization) of the intermediate language representation prior to further translating the intermediate language representation into the machine specific assembly or object code of the second computer(c. 15, ll. 61-65 and Fig. 12). There is no teaching or suggestion that the intermediate language be optimized for interpretation. Indeed,

Goettelmann would have no motivation for developing an intermediate instruction set optimized for interpretation, because Goettelmann takes the intermediate language representation and further translates it into the machine specific assembly or object code of the host computer. Goettelmann does not execute the intermediate language representation itself by interpretation, as recited in the claims of the instant application.

The examiner seems to be arguing that Goettelmann's processing of "side effects" is an optimization (Office Action at p. 2, citing to Goettelmann at c. 31, ll. 50-55). However, any "side effect" processing is simply part of the conventional optimization step that removes redundant and unnecessary code from the intermediate instruction representation prior to *further translation* to the machine specific assembly or object code of the host computer. This processing of "side effects" and the associated removal of redundant code does not teach or suggest an *intermediate instruction set being optimized for interpretation on the host computer*, as recited by the claims.

Accordingly, applicant submits that claims 1, 9, 19, and 27 are patentable over the cited reference. Inasmuch as claims 2-8, 10-18, 20-26, and 28-31 depend from one of claims 1, 9, 19, and 27, these claims are patentable at least by their dependency. For the foregoing reasons, applicants respectfully request reconsideration and withdrawal of the section 102 and 103 rejection of claims 1-15 and 18-31 and the objections to claims 16 and 17.

Conclusion

For the foregoing reasons, applicants respectfully submit that all of the claims of the present application patentably define over the cited references of record, alone or in combination. Reconsideration of the office action and an early notice of allowance are respectfully requested. In the event that the examiner cannot allow the present application for any reason, the examiner is encouraged to contact the undersigned attorney, Raymond N. Scott, Jr. at (215) 564-8951, to discuss resolution of any remaining issues.

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